From: Saved by Windows Internet Explorer 7
Sent: Wednesday, March 14, 2007 12:21 AM
Subject: NEEP: High Performance Schools Exchange: Case Studies: Massachusetts

Northeast Energy Efficiency Partnerships

Facilitating partnerships to advance energy efficiency

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Carlton Elementary School: Salem, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the project:

Salem's new Carlton Elementary School features 31 kW of solar photovoltaic cells, including 30 kW of flat panels mounted on the school roof and 1 kW of photovoltaic-insulated windows for the school's greenhouse. Also planned are a variety of energy-efficiency features, a teaching and energy monitoring station, and other educational program elements designed to teach students about "green," energy efficient, and renewable technologies.

Building Data

Square Feet: N/A

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: June 2004

Architect: Flansburgh Associates

Builder: DeIulis Brothers

High Performance School Data

Estimated Energy Cost Savings: 20.6 percent or $10,709 per year

High Performance Elements Utilized:

31 kW solar photovoltaic

1 kW wind turbine

Teaching and energy monitoring station

Funding and Grants: N/A

More Information

Related Articles: **Carlton Elementary School** (The DeIulis Brothers)

Photos: N/A

Contact:

Dr. Herb Levine

Superintendent

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Centerville Elementary School: Beverly, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the project:

Beverly has installed a combination skylight/daylighting system in the form of a "roof monitor." This skylight allows natural lighting to penetrate into the classroom areas, creating a healthier and more productive teaching and learning environment.The natural light works in combination with photo sensors that automatically dim lights when they are not needed.

Building Data

Square Feet: N/A

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $9.329.000

Cost per Student: N/A

Date Completed: June 2003

Architect: Flansburgh Associates, Inc.

Builder: AMG Construction

High Performance School Data

Estimated Energy Cost Savings:

17.8 percent energy savings or $11,987 per year

25 percent more efficient than the state energy code

High Performance Elements Utilized:

Daylighting

10 kW solar photovoltaic

10 kW wind turbine

Funding and Grants: $623,300 from the Massachusetts Technology Collaborative's Renewable Energy Trust Fund

More Information

Related Articles: **Green Schools Becoming Part of the Lesson** (Boston Business Journal)

Photos: **AMG Construction**

Contact:

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or

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Collicot & Cunningham Elementary School Complex: Milton, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

The Collicot/Cunningham Elementary School construction project will transform two schools that share the same site but occupy two separate buildings into a single building containing two separate schools that share a cafetorium, kitchen, media center, some specialty classrooms, and a common energy source for heating, cooling and electrical needs.

Building Data

Square Feet: N/A
Max Student Population: N/A
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $31,563,392
Cost per Student: N/A
Date Completed: N/A
Architect: Drummey Rosane Anderson
Engineer: Shooshanian Engineering
Builder: Gilbane Building Co.

High Performance School Data

Estimated Energy Cost Savings: N/A

High Performance Elements Utilized:

Indoor Air Quality

42 kW solar roof

Environmental and renewable energy curriculum

Funding and Grants:

$623,000 from the Massachusetts Technology Collaborative

NSTAR Electric Incentives

KeySpan Energy Incentives

More Information

Related Articles: N/A

Photos: N/A

Contact

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Michael E. Capuano Early Childhood Center: Somerville, MA

Source of Information: Design Share

Summary of the Project:

In order to create an enhanced environment for learning through a variety of green, high performance measures, the project used several methods to introduce daylight into classrooms, including translucent skylights and light shelves that bounce sunlight onto the ceiling and then deeper into the classroom. These enhancements provide classrooms with low-glare, even daylighting which has been shown to enhance student learning.

Building Data

Square Feet: 110,900
Max Student Population: 560
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $14,900,000
Cost per Student: $26,607
Date Completed: N/A

Architect: HMFH Architects, Inc.

High Performance School Data

Estimated Energy Cost Savings:

567,318 lb reduction of CO2 emissions

47 percent reduction in electrical use

24 percent reduction in natural gas use

41 per energy cost reduction (approximately $60,000 annual savings)

26 percent building water use reduction (125,000 gallons)

56 percent site water use reduction

High Performance Elements Utilized:

Multiple- Use Building (Community Center)

Translucent skylights

Light shelves

Daylighting

Sensor controlled lighting

High performance building shell

Efficient HVAC system

35 kW photovoltaic system

400 W wind turbine

Improved indoor air quality

Systems commissioning

Environmental curriculum and Web site

Funding and Grants:

$320,000 MTC Renewable Energy Construction

$150,000 MTC Energy Efficiency Construction

$130,000 MTC Green Consultant Fees

$30,000 MTC Green Curriculum Development

$99,000 NSTAR Electric Efficiency construction Incentives

$14,000 NSTAR Natural Gas Efficiency Construction Incentives

$15,000 NSTAR Commissioning

$35,000 NSTAR Design and Analysis Fees

More Information

Related Articles: **Michael E. Capuano Early Childhood Learning Center** (American School Board Journal, Leaning by Design)

Photos: N/A

Contact:

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HMFH Architects

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elmore@hmfh.com

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North Quincy Street Elementary School: Brockton, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

Brockton will use the MTC grant to incorporate three different photovoltaic (PV) installations, a small 400 W wind turbines and solar hot water pre-heating into the design of its North Quincy Street Elementary School. The school will also incorporate a number of other green design measures.

Building Data

Square Feet: N/A

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: N/A

Architect: HMFH Architects, Inc.

Lighting Consultant: David Berg

High Performance School Data

Estimated Energy Cost Savings: 44.5 percent or $56,583 per year

High Performance Elements Utilized:

Photovoltaics

400 W wind turbine

Solar hot water

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact:

David H. Kimball

Senior Director of Administrative Services

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William F. Stanley Elementary School: Waltham, MA

Source of Information:

U.S. Green Building Council

Massachusetts Technology Collaborative

Summary of the Project:

A new elementary school for 516 children with a pre-kindergarten for another 100 children. The site, near the Charles River and the former Waltham watch factory was the location of former City Almshouse. This building takes advantage of the opportunities present on the site, to make maximum use of daylight and passive/active solar energy.

Building Data

Square Feet: 88,667
Max Student Population: 616
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $15,100,000
Cost per Student: Approximately $21,884.06
Date Completed: N/A
Architect: Flansburgh Associates, Inc.

High Performance School Data

Estimated Energy Cost Savings: 26.8 percent or $44,626 per year
High Performance Elements Utilized:

LEED Registered
Daylighting
Photovoltaics
1kW wind turbine
Upgraded insulation

High efficiency windows

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact:

Jay Williams, Associate

Flansburgh Associates, Inc.

77 North Washington St.

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Williamstown Elementary School: Williamstown, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

A 24 kW photovoltaic system has been mounted on the school's south-facing roofs. In addition, Williamstown will conduct and energy efficiency assessment, additional energy-efficiency improvements and an energy audit. These project elements will help determine the overall efficiency of the "green" construction elements.

Building Data

Square Feet: 87,600

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: N/A

Architect: Margo Jones Architects, Inc.

Civil Engineer: Vincent P. Guntlow and Associates

Structural Engineer: Tsiang Engineering, Inc.

Mechanical Engineer: Kowler & Lewis

Electrical Engineer: E. M. Sullivan Co., Inc.

Builder: David J. Tierney Jr., Inc.

Landscape Architect: Dodson Associates

High Performance School Data

Estimated Energy Cost Savings: 35.8 percent or $36,099 per year

High Performance Elements Utilized:

24 kW photovoltaic system

Energy monitoring

Funding and Grants: $568,300 from the Massachusetts Technology Collaborative

More Information

Related Articles: N/A

Photos: N/A

Contact:

Rose Ellis

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Berkshire Hills Reg. School District Middle School: Great Barrington, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

The Berkshire Hills Regional School District is building a truly high performance green middle school that will save energy costs and will improve the health and productivity of students and teachers.

Building Data

Square Feet: N/A

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: N/A

Architect: N/A

High Performance School Data

Estimated Energy Cost Savings: 33.7 percent or $27,793 per year

High Performance Elements Utilized:

50 kW soar array

Ground source heat pumps

Heat recovery

Indoor air quality

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact:

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Business Administrator

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Dedham Middle School: Dedham, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

The new Dedham Middle School, under construction on the site of the current middle school, exemplifies the excellence in high performance design. The long axis of the building will be sited on an east-west axis to optimize daylighting opportunities. Improvements in the energy efficiency of the building will be achieved through optimized mechanical systems, improved building envelope, and the utilization of a high efficiency condensing boiler.

Building Data

Square Feet: 130,000
Max Student Population: N/A
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $26,000,000
Cost per Student: N/A
Date Completed: Summer 2005
Architect: Dore and Whittier
Builder: PJ Stella Construction Corp.
Civil Engineer: David E. Ross Associates

Mechanical Engineer: Garcia Galuska Desousa, Inc.

Energy Consultant: Garcia Galuska Desousa, Inc.

Environmental Building Consultant: ATC Environmental, Inc.

High Performance School Data

Estimated Energy Cost Savings: 30.3 percent or $45,140 per year

High Performance Elements Utilized:

Site Planning and positioning

Daylighting

High efficiency light fixtures

Optimized mechanical systems

Improved building envelope

High efficiency condensing boiler

Storm water recycling

Funding and Grants:

$130,000 MTC Renewable Energy Design

$500,000 MTC Renewable Energy Construction

$175,000 NSTAR Green Technology

More Information

Related Articles: Solar Panels, Recycling Make School Green (Boston Globe)

Photos: Green Build 2005

Contact:

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Ashland High School: Ashland, MA

Source of Information: U.S. Green Building Council

Summary of the Project:

The new high school will incorporate a photovoltaic (PV) array. The system's peak power rating is 33.6 KW(DC) at Standard Testing Conditions. The estimated annual electric energy output from the system amounts to approximately 36,830 kWh, which is over 2.5 percent of the estimated future building electric energy consumption. In addition to being a healthy and productive learning environment, the new High School will cost less to operate and maintain. As a result of the Green design process, the school district will see energy savings of 27 percent over a normal baseline school which is equal to two additional full time teacher's salaries per year. In addition, the school district will receive a minimum of $370,000 in utility company energy savings rebates, as well as $630,000 in funding from the Massachusetts Technology Collaborative.

Building Data

Square Feet: 202,467
Max Student Population: 1,000
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $32,000,000

Cost per Student: Approximately $32,000

Date Completed: N/A

Architect: Mount Vernon Group Architects, Inc.

High Performance School Data

Estimated Energy Cost Savings: estimated 27 percent energy savings

High Performance Elements Utilized:

LEED Registered

Photovoltaics

Funding and Grants:

$370,000 utility company energy saving rebates

$630,000 grant from Massachusetts Technology Collaborative

More Information

Related Articles: N/A

Photos: N/A

Contact:

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jdasilva@mvgarchitects.com

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Blackstone Valley Regional Vocational Technical High School: Upton, MA

Source of Information:

U.S. Green Building Council

Massachusetts Technology Collaborative

Summary of the Project:

The Blackstone Valley Vocational Regional School District is in the midst of an ambitious 80,000 square foot new addition to its high school to accommodate four new vocational programs. The existing building, which has some systems that date back to the 1960's, is being renovated.

Building Data

Square Feet: 80,000

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $36,000,000

Cost per Student: N/A

Date Completed: N/A

Architect: HL Turner Group, Inc.

Builder: Bacon Construction

High Performance School Data

Estimated Energy Cost Savings: 41.1 percent or $160,460 per year

High Performance Elements Utilized:

LEED Registered

Displacement ventilation

High efficiency lighting

Occupancy and daylight sensors

Energy efficient boilers and air conditioning equipment

Daylighting

Indoor air quality

Photovoltaics

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact:

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Falmouth High School: Falmouth, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

Falmouth High School used the MTC design grant to incorporate a fuel cell, geothermal technology and a solar panel system into the design for the renovated Falmouth High School. This school is currently under construction.

Building Data

Square Feet: N/A

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: N/A

Architect: Gilbane

High Performance School Data

Estimated Energy Cost Savings: N/A

High Performance Elements Utilized: N/A

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact:

Dr. Peter Clark

Superintendent of Schools

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Media and Technology Charter High School (MATCH): Boston, MA

Source of Information: American Institute of Steel Construction, Inc.

Summary of the Project:

Intended to serve a self-selected group of urban high school students, this charter school's mission is to use media and technology not for vocational education, but to facilitate instruction of the basics and actively engage college-bound students in their education. Through a historic renovation and adaptive reuse of a 1917 structure, built originally as a Lincoln Motorcar Company showroom, a former auto parts store is being transformed into an innovative educational facility.

Building Data

Square Feet: 31,501
Max Student Population: 200
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: $4,700,000

Cost per Student: Approximately $23,500

Date Completed: N/A

Architect: HMFH Architects, Inc. and DM Berg Consultants

High Performance School Data

Estimated Energy Cost Savings: 33 percent decrease in building's energy use

High Performance Elements Utilized:

Energy efficient glass

Daylighting

Local metal materials

Second-hand furniture

LCD laptops rather than CRT terminals

Highly adsorptive fiberglass acoustic ceiling panels

Cooling tower rather than chiller

Limited parking facilities

Photovoltaics

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact

Charles Sposato

Principal

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Newton South High School: Newton, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

The Newton South High School is undergoing a major addition/renovation project that includes solar panels, energy efficiency measures and other sustainable design features intended to improve environmental quality and enhance the learning environment of the students.

Building Data

Square Feet: N/A

Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: N/A

Architect: N/A

High Performance School Data

Estimated Energy Cost Savings: 35.4 percent or $209,404 per year

High Performance Elements Utilized:

60 kW solar roof

Daylight sensors

Occupancy sensors

Rainwater collection system

Low VOC paints and sealants

Green education program

Funding and Grants: N/A

More Information

Related Articles: N/A

Photos: N/A

Contact:

David Tannozzini

Engineer

(617) 796-1605

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Whitman Hanson Regional School District: Hanson- Whitman, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

The new 232,000 square foot Whitman Hanson Regional High School will be a green solution to overcrowding at the old, aging facility on the same site. Many site features, such as existing paved surfaces and existing athletic fields, will be reincorporated to minimize the impact of the new building. This school is under construction.

Building Data

Square Feet: 232,000

Max Student Population: 1,350

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A

Cost per Student: N/A

Date Completed: N/A

Architect: Architecture Involution

Builder: Agostini Construction

Program Manager: RF Walsh Company, Inc.

Design Engineer: Griffith & Vary, Inc.

Project Manager: Ted Gentry Associates

Energy Efficiency Engineer/Consultant: Andelman & Lelek Engineering, Inc.

High Performance School Data

Estimated Energy Cost Savings:

Estimated Annual Electric Energy Savings: 577,037 kWh

Estimated Annual Gas Savings for Boiler Upgrade: 11,719

CO2 Lifetime Reduction: 5,789 tons

Predicted Energy Savings Beyond Code (per MTC): 38.6%

Predicted Avoided Annual Energy Cost (per MTC): $100,060

High Performance Elements Utilized:

High Performance Glazing

Variable Air Volume (VAV) HVAC distribution system with optimized controls

Variable flow hot/chilled water pumping system

Demand control for kitchen exhaust hoods

Optimized chiller plant with chilled water supply temperature reset control

Demand control ventilation in gym, cafeteria, and auditorium with CO2 sensors

High efficiency gas boilers

Direct/indirect pendant lighting fixtures

Reduced lighting power densities

Daylight harvesting controls

49.5 kW photovoltaic power generation system

Storm water recovery system

Site design that reuses existing parking lots and athletic fields to minimize the impact on open space

Full life cycle cost analysis

Funding and Grants:

$650,000 MTC Design and Technology Grants

$19,000 Design Assistance from Keyspan/National Grid

$43,631 Keyspan Energy Delivery- Technology Incentive

$372,186 National Grid Comprehensive Design Assistance Incentive

Commissioning Services Funded by National Grid

More Information

Related Articles: **Whitman-Hanson Regional High School** (High Profile Monthly)

Photos: N/A

Contact:

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Woburn High School: Woburn, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the Project:

The new high school condenses 340,000 square feet into a footprint of 127,000 square feet, thus preserving open space on the site. The school will incorporate an electricity generating 33.7 kW solar system on the roof and plans have been made to incorporate two fuel cells at a future date. The town-run energy management system, or SCADA, will monitor all building systems 24 hours per day and will help the school achieve its predicted 25 percent energy efficiency beyond code. This school is currently under construction.

Building Data

Square Feet: 340,000
Max Student Population: N/A

Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A
Cost per Student: N/A
Date Completed: Summer 2006
Architect: Tappe Associates
Construction Manager: Municipal Building Consultants

Builder: Macomber

High Performance School Data

Estimated Energy Cost Savings: N/A

High Performance Elements Utilized:

Energy Education Curriculum

Community Center

Multi-use athletic facilities

2 PC-25, 200 kW fuel cells

3,000 square foot PV Panels

Infrared light sensors

Rainwater collection

Funding and Grants: N/A

More Information

Related Articles: **Woburn School Builds Responsibly** (High Profile Monthly, March issue)

Photos: N/A

Contact

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Great Falls Middle School/Turners Falls High School: Gill Montague, MA

Source of Information: Massachusetts Technology Collaborative

Summary of the project:

The Gill- Montague Regional School District installed a 34.2 kW solar photovoltaic system on the roof of the Great Falls Middle School/Turners Falls High School pool building. A variety of measures intended to save energy and increase natural lighting in classroom areas, including skylights and bay windows with reflectors to bounce light into interior spaces, were also part of the project.

Building Data

Square Feet: N/A
Max Student Population: N/A
Previous Max Student Population: N/A

Construction Data

Cost Of Construction: N/A
Cost per Student: N/A
Date Completed: N/A
Architect: Symmes Maini & McKee

Solar Consultants: Solar Design Associates, Inc.

High Performance School Data

Estimated Energy Cost Savings: 31.2 percent or $56,931 per year

High Performance Elements Utilized:

Daylighting

34.2 kW solar photovoltaic system

Funding and Grants: N/A

More Information

Related Articles: **Turner Falls High School**

Photos: N/A

Contact:

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